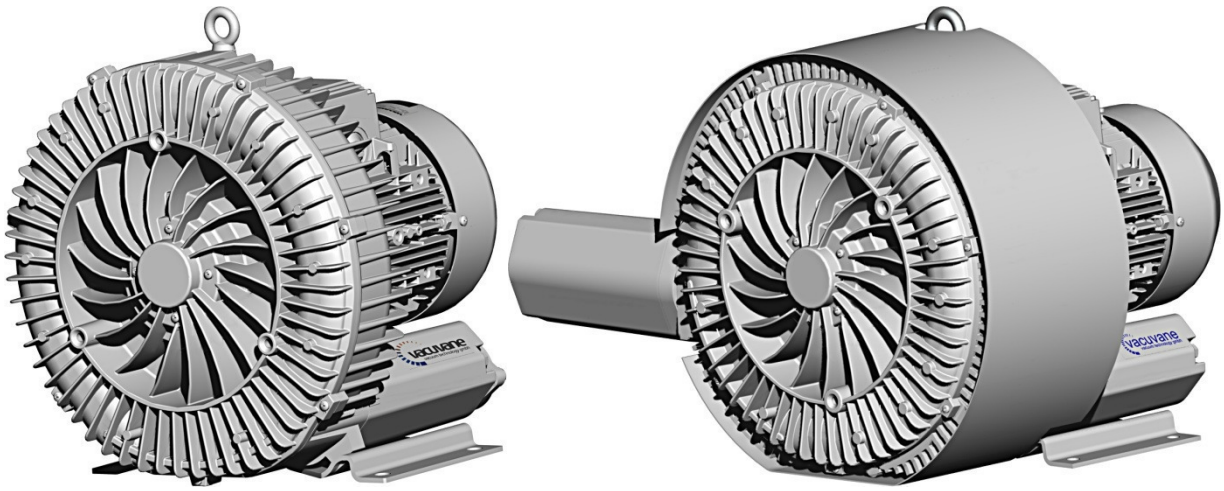
Installation and Operating Instructions



Side Channel Blower
VSC0055 – VSC2050

CE

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Preface

These operating instructions contain information for

- product description,
- safety,
- transport,
- storage,
- installation and commissioning,
- maintenance,
- overhaul,
- troubleshooting and
- spare parts

of the side channel blower.

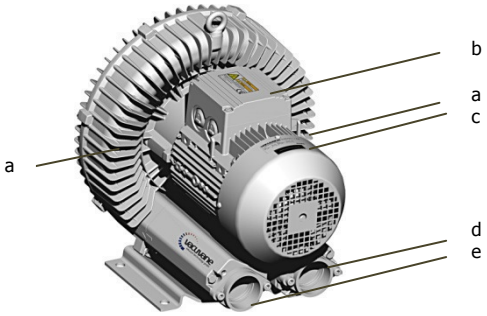
For the purpose of these instructions, "handling" the side channel blower means the transport, storage, installation, commissioning, influence on operating conditions, maintenance, troubleshooting and overhaul of the side channel blower.

Prior to handling the side channel blower these operating instructions shall be read and understood. If anything remains to be clarified please contact your Vacuvane representative!

Keep these operating instructions and, if applicable, other pertinent operating instructions available on site.

Technical Data

Motor connection parameters, nominal speeds and allowed differential pressures are given on the nameplate of the side channel blower. More technical data, available sizes, versions and accessories are given in the current sales programme. In case of further questions please contact your vacuvane representative!



a Directional arrows
b Terminal box
c Nameplate
d Gas discharge / pressure connection
e Gas inlet / suction connection

Product Description

Use

The side channel blower is intended for

- the suction
- the compression

of

- air and other dry, non-aggressive, non-toxic and non-explosive gases

Conveying media with a higher density than air leads to an increased thermal and mechanical load on the side channel blower and is permissible only after prior consultation with vacuvane.

The gas shall be free from vapours that would condensate under the temperature and pressure conditions inside the side channel blower.
The side channel blower is intended for the placement in a non-potentially explosive environment.

The side channel blower is suitable for continuous operation, provided that the housing can transmit heat to the environment unobstructedly and a certain minimum gas transfer is warranted. If there is a risk that the side channel blower may be operated against a closed inlet or outlet for more than a few seconds, a vacuum or pressure relief valve, respectively, shall be provided. Frequent switching on and off leads to increased coil temperatures. In case of doubt seek advice from your vacuvane representative!

The nominal value (=reference value for performance data) for the temperature of the process gas is 15°C. The max. allowed temperature of the inlet gas is 40 "C.
The nominal value for the ambient temperature is 25°C. The min. allowed ambient temperature is -30°C. The max. allowed ambient temperature is 40°C.

Binding data with regard to the allowed differential pressure are to be read from the nameplate (value with negative sign ("-") for vacuum operation, value without sign for pressure operation). The data is valid for ambient temperatures up to 25°C and location altitudes up to 1000 m above sea level. Higher ambient temperatures reduce the allowed differential pressures by up to 10 percent at 40°C. In case of placement in altitudes beyond 1000 m above sea level the allowed differential pressure shall be agreed upon with Vacuvane.

The maximum allowed pressure on the pressure connection (d) is 2 bar abs. By means of process control and/or pressure relief valves it must be made sure that the maximum allowed pressure will not be exceeded.

Principle of Operation

The side channel blower works on the impulse principle, i.e. kinetic energy is transferred from the rotor to the conveyed medium and then is converted into pressure.

For the two stage version:

2 stages, both working on the principle described above, are installed in line in order to achieve a better ultimate/differential pressure.

The side channel blower compresses the inlet gas absolutely oil-free. A lubrication of the pump chamber is neither necessary nor allowed.

Cooling

The side channel blower is cooled by

- radiation of heat from the surface of the side channel blower
- the air flow from the fan wheel of the drive motor
- the process gas

On/off Switch

The side channel blower comes without on/off switch. The control of the side channel blower is to be provided in the course of installation.

Safety

Intended Use

DEFINITION: For the purpose of these instructions, "handling" the side channel blower means the transport, storage, installation, commissioning, influence on operating conditions, maintenance, troubleshooting and overhaul of the side channel blower.

The side channel blower is intended for industrial use. It shall be handled only by qualified personnel.

The allowed media and operational limits according to the "Product Description" and the "Installation Prerequisites" of the side channel blower shall be observed both by the manufacturer of the machinery into which the side channel blower is to be incorporated and by the operator.

The maintenance instructions shall be observed.

Prior to handling the side channel blower these operating instructions shall be read and understood. If anything remains to be clarified please contact your Vacuvane representative!

Safety Notes

The side channel blower has been designed and manufactured according to the state-of-the-art. Nevertheless, residual risks may remain. These operating instructions inform about potential hazards where appropriate. Safety notes are tagged with one of the keywords **DANGER, WARNING** and **CAUTION** as follows:

DANGER

Disregard of this safety note will always lead to accidents with fatal or serious injuries.

WARNING

Disregard of this safety note may lead to accidents with or serious injuries.

CAUTION

Disregard of this safety note may lead to accidents with minor injuries or property danmage.

Noise Emission

CAUTION

Depending on the construction size the side channel blower may emit noise of high intensity.

Depending on the operating state the side channel blower may emit noise in a narrow band.

Risk of damage to the hearing.

Persons staying in the vicinity of a non noise insulated side channel blower over extended periods shall wear ear protection.

Transport

Transport in Packaging

Side channel blowers individually packed in cardboard boxes can be carried by hand.

Packed on a pallet the side channel blower is to be transported with a forklift.

Transport without Packaging

In case the side channel blower is packed in a cardboard box with inflated cushions:

• Remove the inflated cushions from the box

In case the side channel blower is in a cardboard box cushioned with rolled corrugated cardboard:

• Remove the corrugated cardboard from the box

In case the side channel blower is laid in foam:

• Remove the foam

In case the side channel blower is bolted to a pallet or a base plate:

• Remove the bolting between the side channel blower and the pallet/base plate

In case the side channel blower is fastened to the pallet by means of tightening straps:

• Remove the tightening straps

In case the side channel blower weighs less than 20 kg and comes without eyebolts for the attachment of lifting gear:

Version without handle:

• Grasp the side channel blower with both hands

Version with handle:

• Carry the side channel blower using the handle

In case the side channel blower comes with eyebolts for the attachment of lifting gear:

CAUTION

Do not walk, stand or work under suspended loads.

• Attach lifting gear securely to the eyebolt on the cylinder

• Attach the lifting gear to a crane hook with safety latch

• Lift the side channel blower with a crane

In case the side channel blower was bolted to a pallet or a base plate:

• Remove the stud bolts from the rubber feet

Storage

Short-term Storage

• Make sure that the suction connection/gas inlet and the gas discharge/pressure connection are closed (leave the provided plugs in)

• Store the side channel blower

- if possible in original packaging,
- indoors,
- dry,
- dust free and
- vibration free

Conservation

In case of adverse ambient conditions (e.g. aggressive atmosphere, frequent temperature changes) conserve the side channel blower immediately. In case of favourable ambient conditions conserve the side channel blower if a storage of more than 3 months is scheduled.

• Make sure that all ports are firmly closed; seal all ports that are not sealed with PTFE-tape, gaskets or o-rings with adhesive tape

NOTE: VCI stands for "volatile corrosion inhibitor". VCI-products (film, paper, cardboard, foam) evaporate a substance that condenses in molecular thickness on the packed good and by its electro-chemical properties effectively suppresses corrosion on metallic surfaces. However, VCI-products may attack the surfaces of plastics and elastomers. Seek advice from your local packaging dealer! vacuvane uses CORTEC VCI 126 R film for the overseas packaging of large equipment.

• Wrap the side channel blower in VCI film

• Store the side channel blower

- if possible in original packing,
- indoors,
- dry,
- dust free and
- vibration free.

For commissioning after conservation:

• Make sure that all remains of adhesive tape are removed from the ports

• Commission the side channel blower as described in the chapter "Installation and Commissioning"

Installation and Commissioning

Installation Prerequisites

CAUTION

In case of non-compliance with the installation prerequisites, particularly in case of insufficient cooling:

Risk of damage or destruction of the side channel blower and adjoining plant components!

Risk of injury!

The installation prerequisites must be complied with.

• Make sure that the integration of the side channel blower is carried out such that the essential safety requirements of the Machine Directive 98/37/EC are complied with (in the responsibility of the designer of the machinery into which the side channel blower is to be incorporated; see also the note in the EC-Declaration of Conformity)

Mounting Position and Space

The side channel blower can be operated with horizontal or vertical gas flow (with vertical gas flow the drive motor shall be in the uppermost position)

• Make sure that the environment of the side channel blower is not potentially explosive

• Make sure that the following ambient conditions will be complied with:

- Ambient temperature: -5 ... +40 °C

- Ambient pressure: atmospheric

• Make sure that the environmental conditions comply with the protection class of the drive motor (according to the nameplate)

• Make sure that the mounting base is even

• Make sure that in order to warrant a sufficient cooling there will be a clearance of minimum 0.1 m between the side channel blower and nearby walls

• Make sure thate there will a clearance of minimum 3.5 cm (up to construction size 0140) or 5.5 cm (as of constructions size 210) between the fan hood and nearby walls

• Make sure that there will be a clearance of minimum 2 cm (up to construction size 210), 3 cm (for construction size 315) or 4 cm (as of constructions size 530), respectively, between the cover and nearby walls

• Make sure that no heat sensitive parts (plastics, wood, cardboard, paper, electronics) will touch the surface of the side channel blower

• Make sure that the installation space or location is vented such that a sufficient cooling of the side channel blower is warranted

CAUTION

During operation the surface of the side channel blower may reach temperatures of more than 70°C.

Risk of burns!

• Make sure that the side channel blower will not be touched inadvertently during operation, provide a guard if appropriate

Suction Connection/Gas Inlet

CAUTION

Intruding foreign objects or liquids can destroy the side channel blower.

In case the inlet gas can contain dust or other foreign solid particles:

• Make sure that a suitable filter (10 micron or less) is installed upstream the side channel blower

In case of compressor operation:

The following guidelines for the suction line do not apply, if the air to be compressed is taken in right at the side channel blower.

• Make sure that the suction line fits to the suction connection/gas inlet (e) of the side channel blower

• Make sure that the gas will be sucked through a vacuum-tight flexible hose or a pipe

In case of using a pipe:

• Make sure that the pipe will cause no stress on the side channel blower's connection, if necessary use bellows

• Make sure that the line size of the pressure line over the entire length is at least as large as the pressure connection (d) of the side channel blower

In case the length of the pressure line exceeds 2 m it is prudent to use larger line sizes in order to avoid a loss of efficiency and an overload of the side channel blower. Seek advice from your vacuvane representative!

In case the vacuum shall be maintained after shutdown of the side channel blower:

• Provide a manual or automatic operated valve (= non-return valve) in the suction line

• Make sure that the suction line does not contain foreign objects, e.g. welding scales

In case the side channel blower will be used for vacuum application and is likely to run against a closed inlet for more than a few seconds:

• Provide a vacuum relief valve and set it to approx. 75 percent of the max. differential pressure

In case of doubt seek advice from your vacuvane representative!

Gas Discharge

In case of vacuum operation:

The following guidelines for the discharge line do not apply, if the aspirated air is discharged to the environment right at the side channel blower.

• Make sure that the discharge line fits to the gas discharge (d) of the side channel blower

In case of using a pipe:

• Make sure that the pipe will cause no stress on the side channel blower's connection, if necessary use bellows

In case the length of the discharge line exceeds 2 m it is prudent to use larger line sizes in order to avoid a loss of efficiency and an overload of the side channel blower. Seek advice from your vacuvane representative!

• Make sure that the discharge line either slopes away from the side channel blower or provide a liquid separator or a drip leg with a drain cock, so that no liquids can back up into the side channel blower

Pressure Connection

• Make sure that the pressure line fits to the pressure connection (d) of the side channel blower

• Make sure that the pressure connection is connected to a pressure-tight flexible hose or pipe

In case of using a pipe:

• Make sure that the pipe will cause no stress on the side channel blower's connection, if necessary use bellows

• Make sure that the line size of the pressure line over the entire length is at least as large as the pressure connection/gas outlet (d) of the side channel blower

In case the length of the pressure line exceeds 2 m it is prudent to use larger line sizes in order to avoid a loss of efficiency and an overload of the side channel blower. Seek advice from your vacuvane representative!

• Make sure that the pressure line either slopes away from the side channel blower or provide a liquid separator or a drip leg with a drain cock, so that no liquids can back up into the side channel blower

In case the side channel blower will be used for pressure application and is likely to run against a closed outlet for more than a few seconds:

• Provide a pressure relief valve and set it to approx. 75 percent of the max. differential pressure

In case of doubt seek advice from your vacuvane representative!

Electrical Connection / Controls

• Make sure that the stipulations acc. to the EMC-Directive 89/336/EEC and Low-Voltage-Directive 73/23/EEC as well as the EN-standards, electrical and occupational safety directives and the local or national regulations, respectively, are complied with (this is in the responsibility of the designer of the machinery into which the side channel blower is to be incorporated; see also the note in the EC-Declaration of Conformity).

• Make sure that the power supply is compatible with the data on the nameplate of the drive motor

• Make sure that an overload protection according to EN 60204-1 is provided for the drive motor

• Make sure that the drive of the side channel blower will not be affected by electric or electromagnetic disturbance from the mains; if necessary seek advice from the vacuvane service

In case of mobile installation:

• Provide the electrical connection with grommets that serve as strain-relief

Controlling Pressure/Flow

Vacuum operation:

• In order to relieve excess vacuum or to limit the air flow use vent valves. Do not control the vacuum or the flow by throttling of suction or discharge lines. Conveying bypass air will let the side channel blower run cooler and draw less power.

Pressure operation:

• In order to relieve excess pressure or to limit the air flow use bleed valves. Do not control the pressure or the flow by throttling of suction or pressure lines. Bleeding excess air will let the side channel blower run cooler and draw less power.

Installation

Mounting

• Make sure that the "Installation Prerequisites" are complied with

• Fasten the side channel blower at its location

Connecting Electrically

WARNING

Risk of electrical shock, risc of damage of equipment.

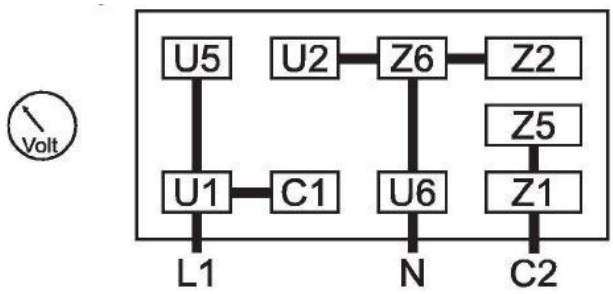
Electrical installation work must only be executed by qualified personnel that knows and observes the following regulations:
- IEC 364 or CENELEC HD 384 or DIN VDE 0100, respectively,
- IEC-Report 664 or DIN VDE 0110,
- BGV A2 (VBG 4) or corresponding national accident prevention regulation.

• Electrically connect the drive motor

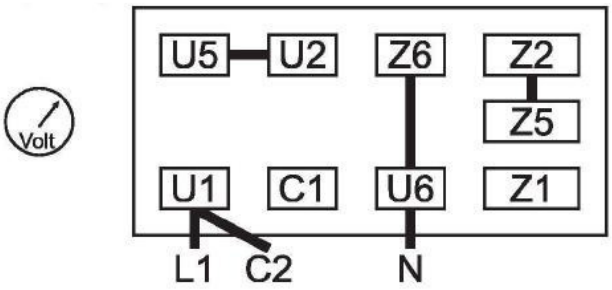
• Connect the protective earth conductor

Connection Scheme Alternating Current Motor

Low voltage connection:

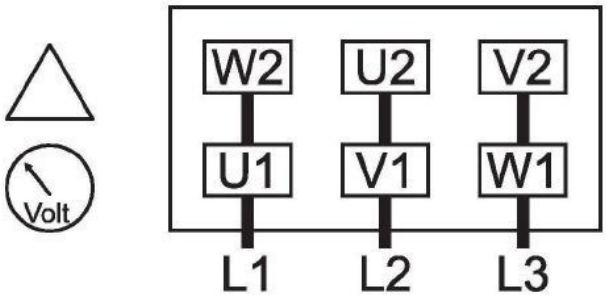


High voltage connection:

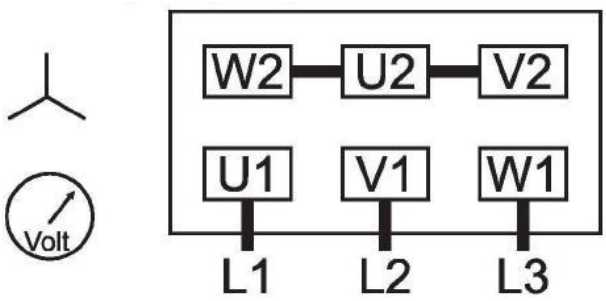


Connection Scheme Three-Phase Motor

Delta connection (low voltage):



Star connection (high voltage):



CAUTION

Operating in the wrong direction of rotation can destroy the side channel blower in short time.

Prior to starting-up it must be made sure that the side channel blower is operated in the proper direction.

NOTE: If certain applications require reverse operation over short periods, please seek advice from your vacuvane representative!

Version with three-phase motor:

• Determine the intended direction of rotation with the arrow (stuck on or cast)

• "Bump" the drive motor

• Watch the fan wheel of the drive motor and determine the direction of rotation just before the fan wheel stops

If the rotation must be changed:

• Switch any two of the drive motor wires (three-phase motor)

Connecting Lines/Pipes

• Connect the suction line

• Connect the discharge line

or

• Connect the pressure line

Installation without discharge line:

• Make sure that the gas discharge (d) is open

Installation without suction line:

• Make sure that the gas inlet (e) is open

• Make sure that all provided covers, guards, hoods etc. are mounted

• Make sure that cooling air inlets and outlets are not covered or obstructed and that the cooling air flow is not affected adversely in any other way

In case the side channel blower comes with an eyebolt for the attachment of lifting gear:

• Make sure that the eyebolt is firmly tightened

Recording of Operational Parameters

As soon as the side channel blower is operated under normal operating conditions:

• Measure the drive motor current and record it as reference for future maintenance and troubleshooting work

Operation Notes

Use

CAUTION

The side channel blower is designed for operation under the conditions described below.

In case of disregard risk of damage or destruction of the side channel blower and adjoining plant components!

Risk of injury!

The side channel blower must only be operated under the conditions described below.

The side channel blower is intended for

- the suction

- the compression

of

- air and other dry, non-aggressive, non-toxic and non-explosive gases

Conveying media with a higher density than air leads to an increased thermal and mechanical load on the side channel blower and is permissible only after prior consultation with vacuvane.

The gas shall be free from vapours that would condensate under the temperature and pressure conditions inside the side channel blower.
The side channel blower is intended for the placement in a non-potentially explosive environment.

The side channel blower is suitable for continuous operation, provided that the housing can transmit heat to the environment unobstructedly and a certain minimum gas transfer is warranted. If there is a risk that the side channel blower may be operated against a closed inlet or outlet for more than a few seconds, a vacuum or pressure relief valve, respectively, shall be provided. Frequent switching on and off leads to increased coil temperatures. In case of doubt seek advice from your vacuvane representative!

The nominal value (=reference value for performance data) for the temperature of the process gas is 15°C. The max. allowed temperature of the inlet gas is 40 "C.
The nominal value for the ambient temperature is 25°C. The min. allowed ambient temperature is -30°C. The max. allowed ambient temperature is 40°C.

Binding data with regard to the allowed differential pressure are to be read from the nameplate (value with negative sign ("-") for vacuum operation, value without sign for pressure operation). The data is valid for ambient temperatures up to 25°C and location altitudes up to 1000 m above sea level. Higher ambient temperatures reduce the allowed differential pressures by up to 10 percent at 40°C. In case of placement in altitudes beyond 1000 m above sea level the allowed differential pressure shall be agreed upon with vacuvane.

The maximum allowed pressure on the pressure connection (d) is 2 bar abs. By means of process control and/or pressure relief valves it must be made sure that the maximum allowed pressure will not be exceeded.

CAUTION

During operation the surface of the side channel blower may reach temperatures of more than 70°C.

Risk of burns!

The side channel blower shall be protected against contact during operation, it shall cool down prior to a required contact or heat protection gloves shall be worn.

CAUTION

Depending on the construction size the side channel blower may emit noise of high intensity.

Depending on the operating state the side channel blower may emit noise in a narrow band.

Risk of damage to the hearing.

Persons staying in the vicinity of a non noise insulated side channel blower over extended periods shall wear ear protection.

• Make sure that all provided covers, guards, hoods etc. remain mounted

• Make sure that protective devices will not be disabled

• Make sure that cooling air inlets and outlets will not be covered or obstructed and that the cooling air flow will not be affected adversely in any other way

• Make sure that the "Installation Prerequisites" are complied with and will remain complied with, particularly that a sufficient cooling will be ensured

Maintenance

DANGER

In case the side channel blower conveyed gas that was contaminated with foreign materials which are dangerous to health, harmful material can reside in filters.

Danger to health during inspection, cleaning or replacement of filters.

Danger to the environment.

Personal protective equipment must be worn during the handling of contaminated filters.

Contaminated filters are special waste and must be disposed of separately in compliance with applicable regulations.

CAUTION

During operation the surface of the side channel blower may reach temperatures of more than 70°C.

Risk of burns!

• Prior to disconnecting connections make sure that the connected pipes/lines are vented to atmospheric pressure

Maintenance Schedule

NOTE: The maintenance intervals depend very much on the individual operating conditions. The intervals given below shall be considered as starting values which should be shortened or extended as appropriate. Particularly heavy duty operation, such like high dust loads in the environment or in the process gas, other contaminations or ingress of process material, can make it necessary to shorten the maintenance intervals significantly.

Monthly:

• Make sure that the side channel blower is shut down and locked against inadvertent start up

In case an inlet air filter is installed:

• Check the inlet air filter, if necessary clean (with compressed air) or replace

In case of operation in a dusty environment:

• Clean as described under" Every 6 Months:"

Every 6 Months:

• Make sure that the housing is free from dust and dirt, clean if necessary

• Make sure that the side channel blower is shut down and locked against inadvertent start up

• Clean the fan cowling, the fan wheel, the ventilation grille and the cooling fins

Every Year:

• Make sure that the side channel blower is shut down and locked against inadvertent start up

In case an inlet air filter is installed:

• Clean (with compressed air) or replace the inlet air filter In case an inlet screen is installed:

• Check the inlet screen, clean if necessary

Overhaul

CAUTION

In order to achieve best efficiency and a long life the side channel blower was assembled and adjusted with precisely defined tolerances.

This adjustment will be lost during dismantling of the side channel blower.

It is therefore strictly recommended that any dismantling of the side channel blower that is beyond of what is described in this manual shall be done by vacuvane service.

DANGER

In case the side channel blower conveyed gas that was contaminated with foreign materials which are dangerous to health, harmful material can reside in pores, gaps and internal spaces of the side channel blower.

Danger to health during dismantling of the side channel blower.

Danger to the environment.

Prior to shipping the side channel blower shall be decontaminated as good as possible and the contamination status shall be stated in a "Declaration of Contamination" (form downloadable from www.vacuvane.com).

vacuvane service will only accept side channel blowers that come with a completely filled in and legally binding signed "Declaration of Contamination" (form downloadable from www.vacuvane.com).

Removal from Service

Temporary Removal from Service

• Prior to disconnecting pipes/lines make sure that all pipes/lines are vented to atmospheric pressure

Recommissioning

• Observe the chapter" Installation and Commissioning"

Dismantling and Disposal

DANGER

In case the side channel blower conveyed gas that was contaminated with foreign materials which are dangerous to health, harmful material can reside in pores, gaps and internal spaces of the side channel blower.

Danger to health during dismantling of the side channel blower.

Danger to the environment.

During dismantling of the side channel blower personal protective equipment must be worn.

The side channel blower must be decontaminated prior to disposal.

• Make sure that materials and components to be treated as special waste have been separated from the side channel blower

• Make sure that the side channel blower is not contaminated with harmful foreign material

According to the best knowledge at the time of printing of this manual the materials used for the manufacture of the side channel blower involve no risk.

• Dispose of the side channel blower as scrap metal

Spare Parts

Only the bearings are intended as spare parts. Commercially available standard parts are to be purchased on the open market. If an overhaul requires parts other than bearings or standard parts your vacuvane representative will clarify whether an overhaul is economic or a replacement side channel blower should be considered.

NOTE: When ordering spare parts or accessories always quote the type and the serial no. of the side channel blower (data on the nameplate).

EC-Declaration

EG Konformitäts-Erklärung
EC Declaration of Conformity

Die/The vacuvane vacuum technology gmbh
Amsterdamstraße 16
97424 Schweinfurt, Germany

erklärt, dass das Produkt
declares that the product

Modell vacuvane VSC
Model vacuvane VSC

auf das sich diese Erklärung bezieht, mit den folgenden Normen übereinstimmt:
to which this declaration relates is in conformity with the following standards:

EN 1012-1 : 1996 Kompressoren und Vakuumpumpen - Sicherheitsanforderungen
EN 1012-2 : 1996 Compressors and vacuum pumps – Safety requirements

gemäss den Bestimmungen der Richtlinien
following the provisions of directives

2006/42/EG Maschinen / Machinery

2006/95/EG Niederspannungsrichtlinie / Low Voltage Equipment

Schweinfurt, 30. September 2009

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